TEF0008 MAX10

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Overview

TEF0008 design for MAX10 FPGA U2: 10M08SAU169C8G.

Feature Summary

- SFP Control
- I^{2}C MUX
- level shifter
- LED Control

Firmware Revision and supported PCB Revision

See Document Change History.

Product Specification

Port Description

Name / opt. VHD Name	Direction	Pin	weak pullup	Description
PLL_SDA_io	Bidir	K2		I^{2}C Si5345A-B
PLL_SCL_o	Out	K1		I^{2}C Si5345A-B

LED	Out	C2		Status LED
A_LOS_i	In	H9		SFP A Signal Loss (HIGH indicates signal loss)
A_MDEF0_i	In	G9		SFP A Module Absent (HIGH when module physically absent)
A_RS0_o	Out	J9		SFP A Rate Select RX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
A_RS1_o	Out	H8		SFP A Rate Select TX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
A_SCL_o	Out	K10		SFP A I^2C Clock
A_SDA_io	Bidir	K11		SFP A I^2C Data
A_TX_DIS_o	Out	H10		SFP A (HIGH disables transmitter)
A_TX_FAULT_i	In	L12		SFP A Laser Fault (HIGH indicates fault)
B_LOS_i	In	K12		SFP B Signal Loss (HIGH indicates signal loss)
B_MDEF0_i	In	J13		SFP B Module Absent (HIGH when module physically absent)
B_RS0_o	Out	J12		SFP B Rate Select RX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
B_RS1_o	Out	L13		SFP B Rate Select TX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
B_SCL_o	Out	H13		SFP B I^2C Clock
B_SDA_io	Bidir	G10		SFP B I^2C Data
B_TX_DIS_o	Out	G13		SFP B (HIGH disables transmitter)
B_TX_FAULT_i	In	G12		SFP B Laser Fault (HIGH indicates fault)
C_LOS_i	In	F12		SFP C Signal Loss (HIGH indicates signal loss)
C_MDEF0_i	In	E12		SFP C Module Absent (HIGH when module physically absent)
C_RS0_o	Out	F13		SFP C Rate Select RX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
C_RS1_o	Out	F9		SFP C Rate Select TX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
C_SCL_o	Out	E13		SFP C I^2C Clock
C_SDA_io	Bidir	D11		SFP C I^2C Data
C_TX_DIS_o	Out	D12		SFP C (HIGH disables transmitter)
C_TX_FAULT_i	In	C12		SFP C Laser Fault (HIGH indicates fault)
D_LOS_i	In	B11		SFP D Signal Loss (HIGH indicates signal loss)
D_MDEF0_i	In	B12		SFP D Module Absent (HIGH when module physically absent)
D_RS0_o	Out	B13		SFP D Rate Select RX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
D_RS1_o	Out	C13		SFP D Rate Select TX (LOW for 1000BASE-SX, HIGH for 10GBASE-SR)
D_SCL_o	Out	A12		SFP D I^2C Clock
D_SDA_io	Bidir	F10		SFP D I^2C Data
D_TX_DIS_o	Out	E9		SFP D (HIGH disables transmitter)
D_TX_FAULT_i	In	D9		SFP D Laser Fault (HIGH indicates fault)
LA00_P	In	M9	ON	SCL In
LA00_N	In	N5	ON	SDA In
LA01_P	Out	L4		SDA Out
LA01_N	In	J5	ON	I2C MUX 0: SEL[0]
LA02_P	In	M13	ON	I2C MUX 1: SEL[1]
LA02_N	In	M12	ON	I2C MUX 2: SEL[2]

LA03_N	In	N6	ON	RS0
LA03_P	In	M5	ON	TX_DISABLE
LA04_N	Out	K7		TX Fault A+B+C+D
LA04_P	In	J7	ON	RS1
LA05_N	Out	L5		LOS A
LA05_P	Out	K5		DEF0 A, SFP A Inserted Flag
LA06_N	Out	J6		LOS B
LA06_P	Out	K6		DEF0 B, SFP B Inserted Flag
LA07_N	Out	M8		LOS C
LA07_P	Out	N8		DEF0 C, SFP C Inserted Flag
LA08_N	Out	M7		LOS D
LA08_P	Out	N7		DEF0 D, SFP D Inserted Flag
LA09_P	-	N4		/currently unused
LA09_N	-	M4		/currently unused

Functional Description

SFP Control

- Input Signal LA03_N sets all four SFP RX modes (LA03_N=HIGH sets RS0 signals LOW for 1000BASE-SX, LA03_N=LOW sets RS0 signals HIGH for 10GBASE-SR)[1]
- Input Signal LA04_P sets all four SFP TX modes (LA04_P=HIGH sets RS1 signals LOW for 1000BASE-SX, LA04_P=LOW sets RS1 signals HIGH for 10GBASE-SR)[1]
- Output Signals LA05_N, LA06_N, LA07_N and LA08_N indicate signal loss of SFP A, B, C and D respectively (HIGH indicates signal loss).
- Output Signals LA05_P, LA06_P, LA07_P and LA08_P indicate SFP A, B, C and D module absent (HIGH when module physically absent).
- Output Signal LA04_N is HIGH when at least one of the four SFPs indicate Laser fault.
- Input LA03_P HIGH sets for all SFPs where the module is physically available (MDEF0_i is LOW) the TX_DIS signal to LOW.[1]

[1]Inverted control as we can not enable weak pulldown in MAX10, we use weak pullup. E.g. TX are all ENABLED at default power up, so the card is working with no FMC LA pin driven.

I^{2}C

- LA00_P, LA00_N and LA01_P form a "three wire I^{2}C" bus with separate data in and output.
- LA01_N, LA02_P and LA02_N are used as selector for the MUX.

SEL	I^{2}C device
000	SFP A
001	SFP B
010	SFP C
011	SFP D
100	Si5345 Clock Generator

For I2C addresses see [TEF0008 TRM](#).

LED

LED is used as Status LED and is on if at least on SFP is connected.

JTAG

MAX10 JTAG for programming is always enabled and accessible via the FMC connector, pin header J3 and test points.

Appx. A: Change History and Legal Notices

Document Change History

To get content of older revision go to "Change History" of this page and select older document revision number.

Revision Changes

Date	Document Revision	CPLD Firmware Revision	Supported PCB Revision	Authors	Description
		REV01	REV01, REV02	**Error rendering macro 'page-info'** Ambiguous method overloading for method jdk. proxy279.$ Proxy4022 #hasConte ntLevelPer mission. Cannot resolve which method to	• added weak pullup column in port description table • clarified functional description section • corrected some typos

Error rendering macro 'page-info'

Ambiguous method overloading for method jdk.proxy279.$Proxy4022#hasContentLevelPermission. Cannot resolve which method to invoke for [null, class java.lang.String, class com.atlassian.confluence.pages.Page] due to overlapping prototypes between: [interface com.atlassian.confluence.user.ConfluenceUser, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject] [interface com.atlassian.user.User, class java.lang.String, class com.atlassian.confluence.core.ContentEntityObject]

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				confluence .core. ContentEn tityObject]	
2018-08-27	v.05		REV01	REV01, REV02	Martin Rohrmüller
					• Added Legal Notices • some typos • small rearrange ments
2018-08-07	v.03		REV01	REV01	John Hartfiel
					• small style update
2018-06-07	v.01		REV01	REV01	Martin Rohrmüller
					• initial document
	All				**Error rendering macro 'page-info'** Ambiguous method overloadin g for method jdk. proxy279.$ Proxy4022 #hasConte ntLevelPer mission. Cannot resolve which method to invoke for [null, class

java.lang. String, class com. atlassian. confluence .pages. Page] due to overlapping prototypes between: [interface com. atlassian. confluence .user. ConfluenceUser, class java. lang. String, class com. atlassian. confluence .core. ContentEntityObject] [interface com. atlassian. user.User, class java. lang. String, class com. atlassian. confluence .core.

ContentEn

tityObject]

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